A deſcription of a SELF-MOVING *or* SENTINEL REGISTER, *invented by* WILLIAM HENRY, *of Lancaſter.*

THE machine conſiſts of the following parts.

1. *A*, A DOOR or common regiſter, applied in the flue of a furnace. The door is fitted in a frame, and made to ſlide eaſily up and down. Plate VI. Fig. I.

2. *B*, A BALANCE or beam, moving on a center; the two arms are of unequal lengths, the longer exceeding the ſhorter in the proportion of two to one; the extremity of each arm is formed into a ſegment of a circle, whoſe radius is equal in length to each reſpective arm. Theſe ſegments muſt be equal to the greateſt riſe or fall of each end of the balance when in uſe.

THE length of the whole beam or balance muſt be regulated by the ſituation of the regiſter *A*, and the copper *C*, hereafter mentioned.

3. *C*,

Sperne larem, ſperne ſarcinulas;
Mora nulla, fuge.

In ENGLISH *thus:*

Poſterity, poſterity, this is your concern,
One day enlightens the next, that next
improves the third.
Be attentive.
Twenty times, ſince the creation of the Sun,
has Veſuvius blazed, never without a horrid
deſtruction of thoſe, that heſitated to fly.
This is a warning, that it may never
ſeize you unapprized.
The womb of this mountain is pregnant with
bitumen, alum, iron, gold, ſilver, nitre
and fountains of water.
Sooner or later it kindles, and, when the ſea
ruſhes in, will give its birth vent.
But, before its labours come on, it is ſhaken,
and ſhakes the earth round it; ſmokes, gleams,
throws up bickering flames, ſhakes the air,
roars horridly, bellows, thunders, drives the
inhabitants from its quarters.
Retire whilſt you may;
Now, now, its throes come on, it burſts out,
it flings up lakes mixt with fire;
Down, down it ruſhes and precipitate
Prevents your tardy flight, and ſtamps your fate:
If it once ſurprizes you, all is over.
If you are wiſe, hear this ſpeaking ſtone.
Neglect your domeſtic concerns, neglect your
goods and chattels, there is no delaying;
Fly.

PLATE 6

Fig 1

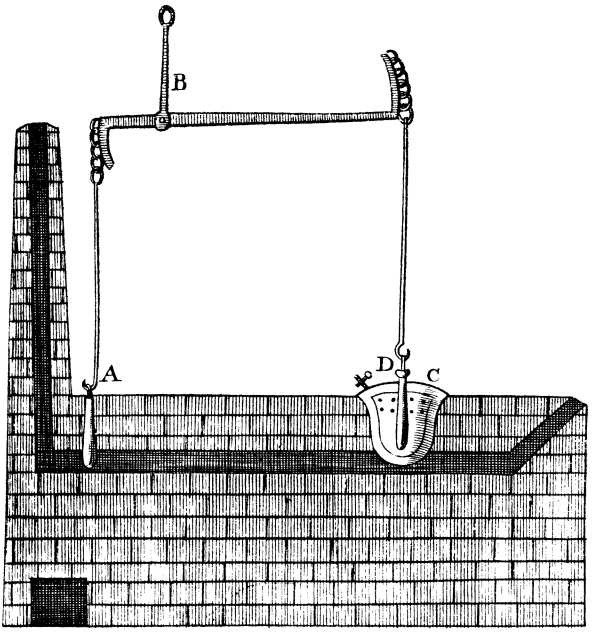
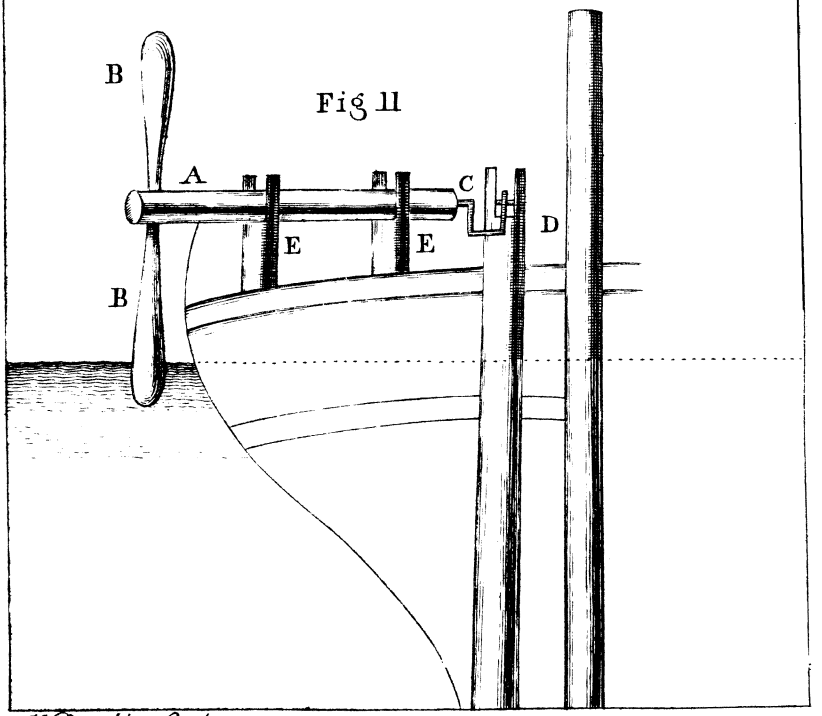


Fig II



R. Dankins Sculp.

3. *C*, A COPPER veſſel, about 13 inches diameter, and 10 inches deep, with a double bottom and ſides, which are placed about an inch and a half apart from each other, leaving a ſpace between to contain air. The top or cover is brazed on, and the whole made air-tight. Through the top is inſerted a braſs cock, and alſo a braſs or copper cylinder, open at both ends, about two inches and a quarter in diameter, and two feet long, ſo fixed as to riſe fourteen inches above the top, and to reach near to the bottom of the veſſel.

THROUGH the ſide of the innermoſt veſſel, near the top, are ſome holes made, whereby the air in the cavity between the two bottoms and ſides may communicate with the air in the inſide of the veſſel.

4. *D*, A PHIAL two inches diameter, and ſeven inches deep, corked and ſealed, with a hook fixed in the cork, by which the phial is ſuſpended.

THESE are the principal parts of the machine, which are to be applied as follows.

FROM the ſurface let there be an horizontal flue, of a convenient length. In the walls of the flue, the frame, in which the regiſter ſlides, is fixed perpendicularly, ſo that when the regiſter is down, the flue is cloſed, when the regiſter is drawn up, the flue is opened, and the higher it is raiſed, the more is the paſſage of the fire enlarged.

To the ſhorter end of the balance, which is ſupported on a proper fulcrum, at a convenient heighth, the regiſter is ſuſpended by a chain and a rod; the chain is juſt long enough to wind over the ſegment of the circle, at the end of the beam. The regiſter is made ſo heavy, as to deſcend by its own weight.

AT the diſtance of two, three, or more feet from the regiſter, and on the flue of the ſurface, the copper veſſel *C* is fixed, ſo as to receive a heat from the fire paſſing through the flue. The end of the longeſt arm of the balance extends di-

rectly over the cylinder fixed in the copper, and to it the phial *D* is ſuſpended, ſo as to hang within the tube, and by ſuch a length of chain and rod as will allow it to be about two or three inches immerſed in the tube, when the balance is in equilibrio. On the ſame end of the beam on which the phial is ſuſpended, a weight is hung ſufficient, with the weight of the phial, to over-balance the regiſter, and raiſe it, and conſequently open the flue. When the flue is opened to a due degree, the regiſter is held in that ſituation, until ſo much water is poured into the copper through the cock, as will fill one third of the veſſel; then ſhut the cock, and pour water into the cylinder, until it riſes high enough to float the phial. By pouring water into the cylinder, the air in the veſſel is compreſſed, and finding no way to eſcape, as the veſſel is air-tight, it reſiſts the water, and prevents its occupying the whole ſpace; and therefore the upper part of the veſſel is apparently empty. The phial is loaded with ſhot, ſo that it will ſwim about one third above the water. When the water riſes in the tube, the phial riſes with it, in which caſe the regiſter *A* is ſo ballanced, that it deſcends, and cloſes the flue.

After this deſcription, the principles on which the Sentinel Regiſter acts, muſt be obvious to every perſon acquainted with the elaſticity of the air, and that this elaſticity is encreaſed by heat. For when the fire in the furnace is encreaſed, the degree of heat in the flue is alſo encreaſed; this encreaſes the elaſticity of the air contained between the double bottom and ſides of the copper, and conſequently of that, which occupies the ſpace above the water, as there is a communication by means of the holes already deſcribed. The elaſticity of the air being increaſed it expands, and by its expanſion forces the water up the tube; the water being raiſed, carries the phial with it, whereupon the regiſter preponderating deſcends, cloſes the flue, and by leſſening the draught of the chimney or flue, deadens or checks the fire in the furnace. By this means again the heat in the flue is diminiſhed, the air in the cavity becomes cooler, and conſequently leſs elaſtic, whereupon the water deſcends in the tube, and with it the phial to its ſtationary point. By the deſcent of the phial the regiſter is raiſed, and opens the flue; by which means it ſtands as a Sentinel over the fire, and preſerves an equal degree of heat.

That

THAT this will be the effect of the machine, I can atteſt, having uſed it for more than a year.

IT is ſubmitted to the curious, whether this machine might not be uſefully applied, 1ſt, to regulate the heat of chymical and alchymical furnaces, where long digeſtions, and a uniform degree of heat are required; 2dly, in the making of ſteel, and in burning of Porcelain ware, in which a due regulation of the fire is of great importance; 3dly, in green or hot houſes, and in apartments for hatching chickens, according to the Egyptian method. With a little alteration it might be applied to the purpoſe of opening doors, windows, and other paſſages, for a draught of air, and thereby preſerve a due temperature of the air in hoſpitals, &c.

An Account of a MACHINE *for pumping Veſſels at Sea, without the Labour of Men.*

By RICHARD WELLS.

IN the courſe of the immenſe trade now purſued on the ocean, veſſels are continually ſubject to leaks, which too often prove fatal to the crews, who, wearied out with inceſſant pumping, are obliged, at laſt, to ſubmit to their unhappy fate, and deſponding ſink into their watery graves. It is therefore much to be deſired, that ſome method could be ſuggeſted for preſerving the lives of ſo intrepid and uſeful a ſet of men. What has occurred to me on this ſubject, I beg leave to lay before the Society, and flatter myſelf, it will not prove altogether unworthy of notice.

WHEN a veſſel ſprings a leak at ſea, which cannot be diſcovered, inſtead of exhauſting the crew with continual working at the pumps, they may form, with very little trouble, a machine to diſcharge the water, which will work itſelf, without any aſſiſtance from the hands on board.

LET a ſpar or ſpare top-maſt be cut to the length of eight or ten feet, or more, according to the ſize of the veſſel; mortice four